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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/675,637	09/29/2000	Kenji Yamanishi	13931	1719

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EXAMINER	
SHARON, AYAL I	
ART UNIT	**PAPER NUMBER**
2123	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/675,637	YAMANISHI ET AL.	
	Examiner	Art Unit	
	Ayal I. Sharon	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6-11 and 14-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-11 and 14-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *9/29/00* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. Claims 1-3, 6-11, and 14-16 of U.S. Application 09/675,637, originally filed on 09/29/2000, are currently pending. The application claims priority to Japanese application 275437/1999, filed 09/29/1999.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/22/2006 has been entered.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-3, 6-11, and 14-16 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted

elements are: the elements that describe how the claimed result (probability, or degree of outlier, or histogram, or parameter values) are "used to detect anomalous data indicative of fraud".

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. **Claims 1-3, 6-11, and 14-16 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims lack a "concrete, useful, tangible" result.**

7. The claims are directed to methods and apparatuses for determining a probability / degree of outlier / histogram / parameter values. This claimed subject matter lacks a practical application of a judicial exception (law of nature, abstract idea, naturally occurring article/phenomenon) since it fails to produce a useful, concrete and tangible result as required in State Street Bank & Trust Co. v. Signature Financial Group Inc., 149 F. 3d 1368, 1373-74 (Fed. Cir. 1998) and AT&T Corp. v. Excel Communications, Inc., 172 F.3d 1352, 50 USPQ2d 1447 (Fed. Cir. 1999).

8. The test for practical application as applied by the examiner involves the determination of the following factors:

   - "**Useful**" – According to MPEP § 2106 (IV)(C)(2)(2)(a), the USPTO's official interpretation of the utility requirement provides that the utility of an

invention has to be (i) specific, (ii) substantial and (iii) credible. MPEP § 2107 and In re Fisher, 421 F.3d at 1372 (citing the Utility Guidelines with approval for interpretation of "specific" and "substantial"). In addition, when the examiner has reason to believe that the claim is not for a practical application that produces a useful result, the claim should be rejected, thus requiring the applicant to distinguish the claim from the three 35 U.S.C. 101 judicial exceptions to patentable subject matter by specifically reciting in the claim the practical application.

- "**Tangible**" - Applying In re Warmerdam, 33 F.3d 1354 (Fed. Cir. 1994), the examiner will determine whether there is simply a mathematical construct claimed, such as a disembodied data structure and method of making it. If so, the claim involves no more than a manipulation of an abstract idea and therefore, is nonstatutory under 35 U.S.C. § 101. In addition, According to MPEP § 2106 (IV)(C)(3), a claim that recites a computer that solely calculates a mathematical formula, or a computer disk that solely stores a mathematical formula, is not directed to the type of subject matter eligible for patent protection. Gottschalk v. Benson, 409 U.S. 63 (1972).
- "**Concrete**" - According to MPEP § 2106 (IV)(C)(2)(2)(a), a claimed process must have a result that can be substantially repeatable, or the process must substantially produce the same result again. In re Swartz, 232 F.3d 862, 864 (Fed. Cir. 2000) (finding that an asserted result

produced by the claimed invention is "irreproducible" claim should be rejected under section 101). The opposite of "concrete" is unrepeatable or unpredictable. An appropriate rejection under 35 U.S.C. § 101 should be accompanied by a lack of enablement rejection, because the invention cannot operate as intended without undue experimentation.

9. The claimed subject matter does not produce a useful result:

   - A **"Useful"** result is missing because the claims fail to recite how the claimed output achieves the intended use of "detecting anomalous data indicative of fraud." Therefore, the claimed result is merely an intermediate result before the useful result, which is the indication of fraud or lack or fraud.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. The prior art used for these rejections is as follows:

   - Lambert et al., U.S. Patent 6,904,409. (Hereinafter "**Lambert**").

12. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

13. **Claims 1-3, 6-11, and 14-16 are rejected under 35 U.S.C. 102(e) as being and by Lambert et al.**

14. In regards to Claim 1, Lambert teaches the following limitations:

1. (Currently Amended) A probability density estimation device for an anomalous data detection system adapted to detect anomalous data, said probability density estimation device configured for a degree of outlier calculation device for sequentially calculating a degree of outlier of each data with a data sequence of real vector values as input,

(See Lambert, especially: col.1, lines 25-30)

said probability density estimation device for, while sequentially reading said data sequence, estimating a probability distribution of generation of the data by using a finite mixture distribution of normal distributions with a weighting parameter, a mean parameter and a variance parameter, said probability density estimation device comprising:

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

probability calculation means for calculating, based on a value of input data and values of a mean parameter and a variance parameter of each of a finite number of normal distribution densities, a probability of generation of the input data from each normal distribution; and

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

parameter output means for updating and rewriting the stored parameter values while forgetting past data, according to newly read data based on a probability obtained by the probability calculation means, values of a mean parameter and a variance parameter of each normal distribution and a weighting parameter of each normal distribution,

(See Lambert, especially: col.2, lines 34-47)

said probability of generation of the input data being used to detect anomalous data indicative of fraud.

(See Lambert, especially: col.1, lines 25-30)

15. In regards to Claim 2, Lambert teaches the following limitations:

2. (Previously Presented) The probability density estimation device as set forth in claim 1, further comprising: parameter storage means for storing values of a mean parameter and a variance parameter of each of a finite number of normal distribution densities and a weighting parameter of each normal distribution, wherein said parameter rewriting means updates and rewrites data of said parameter storage means.

(See Lambert, especially: col.2, lines 34-47)

16. In regards to Claim 3, Lambert teaches the following limitations:

3. (Currently Amended) A degree of outlier calculation device for sequentially calculating a degree of outlier of each data with a data sequence of real vector values as input, said degree of outlier calculation device adapted to detect anomalous data, and comprising:

(See Lambert, especially: col.1, lines 25-30)

a probability density estimation device for, while sequentially reading said data sequence, estimating a probability distribution of generation of the data by using a finite mixture of normal distributions with a weighting parameter, a mean parameter and a variance parameter, said probability density estimation device including:

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

(a) parameter storage means for storing values of a mean parameter and a variance parameter of each of a finite number of normal distribution densities and a weighting parameter of each normal distribution;

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

(b) probability calculation means for calculating, based on a value of input data and values of a mean parameter and a variance parameter of each of a

finite number of normal distribution densities, a probability of generation of the input data from each normal distribution; and

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

(c) parameter rewriting means for updating and rewriting the stored parameter values while forgetting past data, according to newly read data based on a probability obtained by the probability calculation means, values of a mean parameter and a variance parameter of each normal distribution and a weighting parameter of each normal distribution;[[,]] and degree of outlier calculation means for calculating and outputting a degree of outlier of said data by using a parameter of the normal mixture updated by said probability density estimation device and based on a probability distribution. estimated from values of the parameters before and after the updating and the input data, said degree of outlier being used to detect anomalous data indicative of fraud.

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

17. In regards to Claim 6, Lambert teaches the following limitations:

6. (Currently Amended) A histogram calculation device for a degree of outlier calculation device for sequentially calculating a degree of outlier of each data with discrete value data as input, said degree of outlier calculation device useful for anomalous data detection, histogram calculation device for calculating a parameter of a histogram with respect to said discrete value data sequentially input, said histogram calculation device comprising:

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

storage means for storing a parameter value of said histogram; and

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

parameter updating means for reading said parameter value from the storage means and updating past parameter values while forgetting past data based on input data to rewrite the value of said storage means, thereby outputting some of parameter values of said storage means, said histogram being used to detect anomalous data indicative of fraud.

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

18. In regards to Claim 7, Lambert teaches the following limitations:

7. (Currently Amended) A degree of outlier calculation device for sequentially calculating a degree of outlier of each data with discrete value data as input, said degree of outlier calculation device useful for anomalous data detection, and comprising:

(See Lambert, especially: col.1, lines 25-30)

a histogram calculation device for calculating a parameter of a histogram with respect to said discrete value data sequentially input, said histogram calculation device including:

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39)

storage means for storing a parameter value of said histogram; and

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

parameter updating means for reading said parameter value from the storage means and updating past parameter values while forgetting past data based on input data to rewrite the value of said storage means, thereby outputting some of parameter values of said storage means; and

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

score calculation means for calculating, based on the output of the histogram calculation device and said input data, a score of the input data with respect to said histogram, thereby outputting the output of the score calculation means as a degree of outlier of said input data,. said degree of outlier being used to detect anomalous data indicative of fraud.

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

19. In regards to Claim 8, Lambert teaches the following limitations:

8. (Currently Amended) A degree of outlier calculation device for calculating a degree of outlier with respect to sequentially input data which is described both in a discrete value and a continuous value, said degree of outlier calculation device useful for anomalous data detection, and comprising:

(See Lambert, especially: col.15 line 55 to col.16 line 8)

a histogram calculation device for estimating a histogram with respect to a discrete value data part;

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

a number of probability density estimation devices, the number equal to the number of cells of said histogram, the probability density estimation devices for estimating a probability density with respect to a continuous value data part;

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

cell determination means for determining to which cell of said histogram said discrete value data part belongs to send the continuous data part to the corresponding one of said probability density estimation devices; and

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

score calculation means for calculating a score of said input data based on a probability distribution estimated from output values of said histogram calculation device and said probability density estimation device and said input data, thereby outputting the output of the score calculation means as a degree of outlier of said input data;

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

said histogram calculation device including:

storage means for storing a parameter value of said histogram; and

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

parameter updating means for reading said parameter value from the storage means and updating past parameter values while forgetting past data based on input data to rewrite the value of said storage means, thereby outputting some of parameter values of said storage means; and

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

said probability density estimation device including:

parameter storage means for storing values of a mean parameter and a variance parameter of each of a finite number of normal distribution densities and a weighting parameter of each normal distribution;

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

probability calculation means for calculating, based on a value of input data, and values of a mean parameter and a variance parameter of each of a finite number of normal distribution densities, a probability of generation of the input data from each normal distribution; and

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

parameter rewriting means for updating and rewriting the stored parameter values while forgetting past data, according to newly read data based on a probability obtained by the probability calculation means, values of a mean parameter and a variance parameter of each normal distribution and a weighting parameter of each normal distribution, said degree of outlier being used to detect anomalous data indicative of fraud.

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

20. In regards to Claim 9, Lambert teaches the following limitations:

9. (Currently Amended) A degree of outlier calculation device for calculating a degree of outlier with respect to sequentially input data which is described both in a discrete value and a continuous value, said degree of outlier calculation device useful for anomalous data detection, and comprising:

a histogram calculation device for estimating a histogram with respect to said discrete value data part;

(See Lambert, especially: col.15 line 55 to col.16 line 8)

a number of probability density estimation devices, the number equal to the number of cells of said histogram for estimating a probability density with respect to a continuous value data part;

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

cell determination means for determining to which cell of the histogram said discrete value data part belongs to send the continuous data part to the corresponding one of said probability density estimation devices; and

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

score calculation means for calculating a scare of said input data based on a probability distribution estimated from output values of said histogram calculation device and said probability density estimation device and said input data, thereby outputting the output of the score calculation means as a degree of outlier of said input data;

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

said histogram calculation device including:
storage means for storing a parameter value of said histogram; and

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

parameter updating means for reading said parameter value from the storage means and updating past parameter values while forgetting past data based on input data to rewrite the value of said storage means, thereby outputting some of parameter values of said storage means; and

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

said probability density estimation device including:

parameter storage means for storing a value of a parameter indicative of a position of each kernel; and

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

parameter rewriting means for reading a value of a parameter from the storage means and updating the stored parameter values while forgetting past data, according to newly read data to rewrite the contents of the parameter storage means, <u>said degree of outlier being used to detect anomalous data indicative of fraud</u>.

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

21. In regards to Claim 10, Lambert teaches the following limitations:

10. (Currently Amended) A probability density estimation method for a degree of outlier calculation device of a data processor for sequentially calculating a degree of outlier of each data with a data sequence of real vector values as input, said degree of outlier calculation device useful for anomalous data detection, said probability density estimation method of, while sequentially reading said data sequence, estimating a probability distribution of generation of the data by using a finite mixture of normal distributions with a weighting parameter, a mean parameter and a variance parameter, the method comprising:

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

based on values of a mean parameter and a variance parameter of each of a finite number of normal distribution densities read from parameter storage means for storing a value of input data, values of a mean parameter and a variance parameter of each of a finite number of normal distribution densities, and a weighting parameter of each normal distribution, calculating a probability of generation of the input data from each normal distribution; and

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

updating the stored parameter values while forgetting past data, according to newly read data based on a probability obtained by the probability calculation means, values of a mean parameter and a variance parameter of each normal distribution and a weighting parameter of each normal distribution to rewrite data of said parameter storage means;

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

said probability of generation being used to detect anomalous data indicative of fraud.

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

22. In regards to Claim 11, Lambert teaches the following limitations:

11. (Currently Amended) A computer-readable medium incorporating a program of instructions executable by a computer for performing a method of sequentially calculating a degree of outlier of each data for anomalous data detection, with a data sequence of real vector values as input, including a probability density

estimation for, while sequentially reading said data sequence, estimating a probability distribution of generation of the data by using a finite mixture of normal distributions with a weighting parameter, a mean parameter and a variance parameter, the probability density estimation comprising:

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

based on values of a mean parameter and a variance parameter of each of a finite number of normal distribution densities read from parameter storage means for storing a value of input data, values of a mean parameter and a variance parameter of each of a finite number of normal distribution densities, and a weighting parameter of each normal distribution, calculating a probability of generation of the input data from each normal distribution; and

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

updating the stored parameter values while forgetting past data, according to newly read data based on a probability obtained by the probability calculation means, values of a mean parameter and a variance parameter of each normal distribution and a weighting parameter of each normal distribution to rewrite data of said parameter storage means; said

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

method of sequentially calculating a degree of outlier of each data further comprising calculating and outputting a degree of outlier of said data by using a parameter of the finite mixture distribution updated by said probability density estimation and based on a probability distribution estimated from values of the parameters before and after the updating and the input data, said degree of outlier being used to detect anomalous data indicative of fraud.

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

23. In regards to Claim 14, Lambert teaches the following limitations:

14. (Currently Amended) A computer-readable medium incorporating a program of instructions executable by a computer for performing a histogram calculation method for use in calculation of a degree of outlier for sequentially calculating a degree of outlier of each data with discrete value data as input, said calculation of the degree of outlier useful for detecting anomalous data said histogram

calculation method calculating a parameter of a histogram with respect to said discrete value data sequentially input, comprising:

reading said parameter value from storage means for storing a parameter value of said histogram and updating past parameter values while forgetting past data based on input data to rewrite the value of said storage means; and

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

outputting some of parameter values of said storage means, said parameter values being used to detect anomalous data indicative of fraud.

(See Lambert, especially: col.1, lines 25-30; col.2, lines 34-47; col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

24. In regards to Claim 15, Lambert teaches the following limitations:

15. (Currently Amended) A degree of outlier calculation device of a data processor for sequentially calculating a degree of outlier of each data with discrete value data as input, said degree of outlier calculation device useful for detecting anomalous data, and said degree of outlier calculation device comprising:

a histogram calculation device for calculating a parameter of a histogram with respect to said discrete value data sequentially input, including:

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

storage means for storing a parameter value of said histogram; and

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

parameter updating means for reading said parameter value from the storage means and updating past parameter values while forgetting past data based on input data to rewrite the value of said storage means, thereby outputting some of parameter values of said storage means; and
score calculation means for calculating, based on the output of the histogram calculation device and said input data, a score of the input data with respect to said histogram, thereby outputting the score calculation result as a degree of outlier of said input data, said degree of outlier being used to detect anomalous data indicative of fraud.

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

25. In regards to Claim 16, Lambert teaches the following limitations:

16. (Currently Amended) A degree of outlier calculation method of calculating a degree of outlier by a data processor with respect to sequentially input data which is described both in a discrete value and a continuous value, calculation of the degree of outlier useful for detection of anomalous data, wherein a histogram calculation estimates a histogram with respect to a discrete value data part, said method comprising:

reading said parameter value from storage means for storing a parameter value of said histogram and updating past parameter values while forgetting past data based on input data to rewrite the value of said storage means; and

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

outputting some of parameter values of said storage means, and wherein

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

probability density estimation devices provided as many as the number of cells of said histogram for estimating a probability density with respect to a continuous value data part, said method comprises the steps of:

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

based on values of a mean parameter and a variance parameter of each of a finite number of normal distribution densities read from parameter storage means for storing a value of input data, values of a mean parameter and variance parameter of each of a finite number of normal distribution densities and a weighting parameter of each normal distribution, calculating a probability of generation of the input data from each normal distribution;

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

based on a probability obtained by the probability calculation means, values of a mean parameter and a variance parameter of each normal distribution and a weighting parameter of each normal distribution, updating the stored parameter values while forgetting past data, according to newly read data to rewrite the data of said parameter storage means; determining to which cell of

said histogram said discrete value data part belongs to send the continuous data part to the corresponding one of said probability density estimation devices;

(See Lambert, especially: col.7, lines 23-28; col.14, lines 9-12; and col.15 line 55 to col.16 line 8)

calculating a score of said input data based on a probability distribution estimated from output values of said histogram calculation device and said probability density estimation device and said input data; and

(See Lambert, especially: Figures 2 & 3 and associated text at col.6, line 2 to col.7, line 39; including the formulas for IE and KL)

outputting the score calculation result as a degree of outlier of said input data, said degree of outlier being used to detect anomalous data indicative of fraud.

(See Lambert, especially: col.1, lines 25-30; and col.2, lines 34-47)

Response to Arguments

Re: 35 USC § 101

26. Applicants' amendments to claims 10, 11, and 14 have overcome the 101 rejections based on non-functional descriptive material (see MPEP § 2106, subsection IV.B.1(a)). These rejections have been withdrawn.

27. Applicants' amendments to claims 1-3, 6-11, and 14-16 have not overcome the 101 rejections based on lack of a concrete, useful, tangible result have been maintained.

28. The newly amended limitations of "probability / degree of outlier / histogram / parameter values ... being used to detect anomalous data indicative of fraud" indicates an intended use, but there are missing elements in the claims. It is not clear how the probability / degree of outlier / histogram / parameter values are

"used to detect anomalous data indicative of fraud". Therefore, the claimed result is merely an intermediate result before the useful final result - which would be the indicator of fraud or lack or fraud.

Conclusion

29. The following prior art, made of record and not relied upon, is considered pertinent to applicant's disclosure.

30. Cox, K. et al. "Visual Data Mining: Recognizing Telephone Calling Fraud." Data Mining and Knowledge Discovery, Vol.1, pp.225-231 (1997).

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (571) 272-3714. The examiner can normally be reached on Monday through Thursday, and the first Friday of a bi-week, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached at (571) 272-3753.

Any response to this office action should be faxed to (571) 273- 8300, or mailed to:

USPTO
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 Receptionist, whose telephone number is (571) 272-2100.

Ayal I. Sharon
Art Unit 2123
March 8, 2007

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3/9/07